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# An Inaugural Dissertation On Digestion

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Wm. Stith. – Virg.a

admitted March 16th 1821.

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# Of Digestion

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By the term Digestion we are to understand that function of assimilation, by which the various changes are produced, which extraneous substances undergo, when subjected to the action of the digestive apparatus; producing a compound eminently sub=servient to the growth and nourishment of the body. Owing to the changes of composition and decomposition, that are continually going on in all living bodies, a disunion of their elements, an alteration and decomposition of the whole mass, constituting the body, would necessarily ensue if not prevented through the medium of assimilation, which, consisting of the changes that the food undergoes when taken into the digestive system, or Digestion and Chylification, of the changes that are wrought on the nutritive fluid, during its circulation through the body, or in other words Sanguification and Secretion, and also of the lodgement and removal of its particles in almost every part of the bo=dy, constituting what are call'd Nutrition and Absorp=

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=tion, serves the purpose of reproduction. This internal motion takes place to such a degree that the animal machine is entirely renewed in the course of several years. Experiments have been made by physiologists tending to ascertain the exact period, at which this renewal happens. Some have supposed that it happens at the expiration of seven years; some in three years, and others have even gone so far as to assert that it takes place in the short space of fifty days; but these calculations are liable to great uncertainties and al=
=most insuperable objections, occasioned by the different degrees of health, sickness, age, temperament &c. Owing to this en=
=tire renovation, the human body has been very ingenious=
=ly compared to the famous ship, Argo, which, after her long and perilous voyage, contained not a particle of her original materials.

# Of the Digestive Apparatus

Every animal from man down to the Polypus, ex=
=hibits a digestive canal differently formed. It may there=

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=fore be considered as an essential characteristick of animals, pointing out the grand distinguishing mark between them and vegetables. In some animals it consists of a mem= =branous pouch or bag; in others of a long tortuous, muscu= =lo-membranous tube, extending from the mouth to the anus, as in man, fanciffully compared by some anatomists to a meandrous stream fertilizing the plain through which it pas= =ses. Again in some there is only one opening serving the common purpose of receiving the food and ejecting the ex= =crementitious part, as is the case with the Zoophyte; but gen= =erally there are two openings, the one serving the purpose of receiving the aliment, as the mouth, and the other dischar= =ging the office of an outlet for the excrementitious mass.

In man it is not of an uniform size throughout it's whole length, being expanded at the commencement to form the Mouth and Pharynx, and then contracted to form the Oesophagus, which leads from the Pharynx to that important organ, the Stomach, which is a musculo-membranous bag, formed by the widening of the parietes of the alimentary canal. It is then contracted into a long, winding, hollow tube, five or

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six times the length of the body, but proportionally longer in the child than in the adult. This part constitutes what are called the Intestines; the upper portion of which being smaller than the lower, has induced anatomists to divide them into small and great Intestines; each of which is subdivided into three others, viz. the Duodenum, Jejunum, and Ilium, constituting the small, the Cæcum, Colon, and Rectum, forming the large intestines. The canal is presented of various lengths in different animals; according to the nature and quality of the food to be digested; approaching more or less to the materials of the body into which it is to be converted: consequently it differs considerably in the herbivorous and carnivorous animals, being in the former much more extensive and capacious; indeed often complicated, so constructed as to retain the foreign aliment a sufficient length of time to be thoroughly digested; whilst in the latter it is quite differently constructed, being simply a short and straight canal, whereby the food, which is animal, already approaching near to the materials of the body, may have a speedy exit. The reason why it is thus constructed

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by nature is obvious enough. If the aliment were to remain longer, it would, being naturally easy of putrefaction, probably undergo that process, by which the system would experience effects eminently deleterious. Between these manifolds a middle grade. Before we proceed any farther, let us make a few remarks on Food, Hunger, and Thirst.

Whilst some animals derive their nourishment solely from the vast stores of the vegetable, others live entirely on the animal kingdom. Here again man enjoys mediocrity. He is not compelled to live exclusively on the one kingdom, nor the other; but yielding to the dictates of his own appetite he partakes indifferently of both.

Indeed as man is not confined to any portion of the globe, inhabiting the torrid as well as the frigid zone, which include countries yielding solely the one kingdom or the other, it must necessarily follow that nature did not intend him to subsist exclusively on either: nevertheless there is a selection of food among the different nations. Those inhabiting the South prefer a vegetable diet, because its Digestion produces less heat; whilst those

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inhabiting the Northern climes, live on more nourishing and stimulating food, such as animal flesh. They moreover, to add to the heating quality of their nourishment, generally use stimulating drinks. Necessary as it is that all animals should eat, it is no less necessary that they should drink. It is still a matter of dispute among Physiologists whether water affords any nutritive principle, or whether it is taken for the purpose of dissolving the food and serving as its vehicle: thereby principally promoting Digestion. But it is probable that it is subservient to purposes much more important.

## Of Hunger and Thirst

All animals are naturally warned by the desires of Hunger and Thirst to seek a supply of nourishment for the purpose of compensating the losses which they daily sustain. The term Hunger may be defined, that distressing sensation which is caused by a diminished quantity of, or a too long abstinence from food. If this ab-

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Abstinence be continued too long it will be productive of the most serious consequences; a considerable diminution of the bulk of the body, languor debility an increased sensibility and a painful sensation at the pit of the stomach, are the most immediate effects, and if urged still farther even death will be the consequence. Persons die of hunger more speedily according to the activity of growth and nutrition: hence children die sooner than adults.

The different theories that have been advanced to explain the phenomena of hunger, such as an uneasiness in the stomach arising from its being in an empty state the irritation produced on the Diaphragm by the weight of the Liver and Spleen, not receiving their due support from the stomach, when in an empty condition. the effect caused by the action of the gastric juice on the parietes of the stomach, the supposed acrimony generated in the gastric fluid &c. are ridiculous in the extreme, so much so, that I deem it needless to recount them. At present there are only two theories deserving attention. The first is that which attributes it to a ner-

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This is rendered more probable when we consider that it is like all other nervous sensations under the influence of habit. Thus we see the period of meals is entirely ar=
=bitrary with the individuals. We also know that hun=
ger is considerably influenced by passions of the mind, sleep, &c. But to add still farther to the plausibility of this theo=
=ry, we should not neglect to mention, that if the stomach be affected in any manner, such as schirrhosity of the pylorus, &c. the distressing desire of hunger will not be ap=
peased although a sufficient quantity of food be taken into the stomach. This at first view appears greatly to sup=
port the hypothesis, but by examining it still farther we shall find that hunger in this case is kept up by the irritable stat. of the stomach, provoking it to expel its con=
tents almost immediately after their reception, before chyle or even chyme could be formed.

The following objection will also offer itself: why, if hunger be a nervous sensation in the stomach, produ=

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ced by sympathising with the wants of the general system, should it be relieved immediately on the reception of a suf=ficient quantity of food. This objection gave rise to the following theory, that hunger is a sensation caused by the corrugation of the interior coat of the stomach. This ac=counts for its being increased by cold drinks, bitters, as=tringents, &c. In the same manner it explains the dim=inution of hunger by warm drinks and any thing that relaxes the system. The food causing a distension of the stomach, thereby uncorrugating the corrugation, removes hun=ger. Like the preceding theory it accounts for hunger's being subject to the laws of habit and nervous influence.

Whatever diminishes the secretion of the Mouth and Throat, or carries off the fluid when secreted, pro=duces the sensations of heat and dryness, which charac=terize Thirst. In the same manner we may also ex=plain why thirst is so urgent and troublesome when the expirations or secretions of the different parts of the body are inordinately increased; which, diverting the watery part of the blood from the mouth and throat, consequently

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produce thirst. Such is the case in dropsies. Water does not alleviate thirst so readily as more stimulating drinks, which more easily reproducing the secretion of the mouth and throat consequently seem allay thirst. The effects of thirst, although so very distressing, are not so mischievous as those of hunger, as instances are on record of persons living months, and even years without drinking: so likewise have instances been recorded of individuals living the period of ten years and even longer without receiving any nourishment; but these cases are of such rare occurrence that I consider them to be almost void of the least credibility.

## Of Mastication & Salivary Solution

When the food is received into the Mouth it is subjected to the action of the Lips, Cheeks, Tongue, and Jaws with their Teeth, by which a complete division is effected, for the purpose of being more readily mixed with

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the Saliva, which is a transparent viscid fluid, consisting of water, albumen, and several salts. It is secreted by the glands in the neighbourhood of the mouth, and poured on its parietes in considerable quantity, especially during mastication. The obvious use of the Saliva is to moisten the parietes of the mouth and surface of the tongue, for the purpose of rendering them more sensible to the impressions of sapid substances.

It also, by its lubricating quality, facilitates the passage of the food into the stomach. But its use probably does not stop here; on the contrary it is generally believed that it exerts some action on the aliment preparatory to Digestion; an action perhaps similar to that of the gastric fluid. May not the union of oxygen with the Saliva and aliment, during mastication bring about some auxiliary change? After the food has been thoroughly masticated and penetrated by the Saliva, it is collected from the different parts of the mouth, by the tongue, and presented on its upper surface in the form of a bolus. It is then forced into the pharynx, by the rais-

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## Deglutition

The food does not descend through the pharynx and œsophagus materially by its own gravity, but principally by the contraction of the adjacent muscles, and also by the contraction of the muscular coats of the pharynx and œsophagus. This is proved when the muscles of deglu-tition are affected with paralysis. We also see it daily illustrated in cows, horses, sheep &c. which, whilst they are grazing, swallow their food with ease, although their heads be lower than their bodies. The passage of the food into the stomach is facilitated by the lubri-cating quality of the mucus that is secreted by the internal coat of the pharynx and œsophagus.

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# Of Digestion in the Stomach

The aliment, after having received the impression of mastication and the saliva, is accumulated in the stomach, there to be influenced by changes still more important than those hitherto noticed; but what these changes are, is yet undecided.

Before I proceed to speak of the processes, which are now generally supposed to effect Digestion in the Stomach, it may not be improper to mention the various theories, that have been advanced on the subject; but to mention them in detail would be both useless and tiresome: let it therefore suffice to touch each of them briefly. Concoction is the first theory that was advanced to explain the Phenomena of Digestion. It is the theory of the ancients; but they did not mean by the term, to signify that heat is the sole cause of Digestion, but that it is the principal agent; as the word itself implies. Certain it is that heat is essentially necessary

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to the due performance of Digestion. This is shown by the experiments of Spallanzani, which prove, that the gastric juice, one of the principal agents of Digestion, has no more effect than common water in dissolving alimentary substances, when the temperature is below twenty one degrees, of Fahrenheit's thermometer; but on the contrary, that its activity is considerably increased, when the temperature is raised to thirty two degrees above the freezing point.
Mr. John Hunter thinks, "that heat is not the immediate, but the remote cause of Digestion: producing in the animal an increased activity of all its functions." Dr. Senner speaks to the same purpose. He says, "that heat rouses up the actions of the animal oeconomy, and the parts being unable to carry on these actions without being supplied with nourishment, the stomach must be stimulated to digest, to afford that supply". The next theory is Fermentation, which was invented by the chemists, who prosecuted it with such zeal, that at one time it was generally adopted; but in the present reformed state of our science it has fallen into disrepute. The principal argument, on which

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it rests, is, that only those substances afford nourishment, which are capable of undergoing the process of fermentation.

This is true enough; but may not these substances, when taken into the stomach, enter into compounds necessary for the formation of the products of Digestion in this organ, without previously undergoing fermentation? It was believed by the ancients, as all substances, which ferment, undergo that process more easily, if some substance, which has already fermented, be added to them, that there continually exists in the stomach a certain leaven, either resulting from a secretory action, or consisting of a portion of the food already digested; but it is probable, and in fact certain, that no such leaven is formed; and moreover it is sufficiently known, that after Digestion is thoroughly completed, no food remains in the stomach to serve that purpose. Richerand says, If fermentation be the process by which Digestion is performed, it is more probable that it is effected by the panary and saccharine, than by the vinous, acetous, or putrid fermentation. Fermentation so far from being the cause of Digestion, is found to be prevented, and even, an-

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-rested by the stomach in an eminent degree. Fermentation at present is considered as a leading symptom of **indigestion**. Mr. J. Hunter, whose opinions are entitled to so much credit and respect, says." it may be admitted as an axiom, that two processes cannot go on at the same time, in the same part of any substance, therefore neither vegetable nor animal sub-stances can undergo their spontaneous changes while in the act of being digested, it being a process superior in power to that of fermentation." But, continues Mr. Hunter " If the digestive powers be not perfect, then the vinous and ace-tous will take place in the vegetable, and the putrefactive in the food of those animals which live wholly on flesh; although in the last I imagine but very seldom." Indeed it would seem that Digestion and fermentation are directly opposed to each other, the one having for its object the nour-ishment and preservation of the body, whereas the other tends continually to its destruction. The next theory that attracts our attention, is Trituration. This is the invention of the mechanical philosophers, who reasoning from false anal-ogy, compared the changes which the food undergoes in

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the gizzard of the fowl to those wrought by the stomach but the comparison is extremely improper, since the one, viz. the gizzard is really the organ of mastication, and the other that of Digestion.

Drs Stevens and Spallanzani performed experiments tending to prove, that Digestion is effected independently of trituration. To effect this purpose the one caused to be swallowed, and the other himself swallowed small tubes containing digestible articles, when on examination, after they were expelled from the stomach they were found to have undergone Digestion. Moreover it is sufficiently known, that certain substances, as the seeds of various vegetables &c. frequently pass through the digestive system without being triturated or even materially altered.

Maceration is another theory that was proposed to explain the phenomena of Digestion. It was the opinion of the illustrious Haller, that the aliment in the stomach undergoes a slow degree of maceration, and that this is effected partly by the gastric juice, and partly by other secondary causes. The four fold stomach of certain animals, at first view, appear to add great plausibility to this

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hypothesis, but by farther examination we shall be led to believe, that this structure is intended merely to detain the food for the purpose of producing some changes similar to Maceration, preparatory to the real digestive process. In these animals, viz. the ruminating class, the Stomach is divided into four distinct apartments. One called the Paunch, into which the food, after imperfect Mastication, descends. Another called the Bonnet into which the food passes from the first. From the Bonnet, the food being formed into a bolus, rises into the mouth, there again to be chewed. From the mouth it descends into the third division, the Many-plies, whence it is passed into the last stomach denominated the Abomasum, in which the most important part of the Stomachic Digestion is performed.

Maceration is inadequate to the product of Digestion; since it only softens and dissolves the alimentary mass without effecting any new compounds.

All these hypotheses being abandoned as insufficient to account for the phenomena of Digestion, it was necessary

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that some other should be proposed: accordingly we find that the attention of Physiologists was directed more particularly to the investigation of the gastric juice. This fluid so curious and interesting in its properties, is secreted by the exhalent arteries ramifying on the internal surface of the Stomach.

Its nature has been a matter of much dispute among Physiologists. Some have supposed it to be acid, and some alkaline; while others have asserted it to be exclusively acid in some, and alkaline in other animals: but it has been shewn by the experiments of Spallanzani, J. Hunter, and others, to be incorrect that it is neither exclusively acid nor alkaline in different animals, but nearly the same in all: though from the result of some of their experiments, they seem to think, that it may be altered according to the nature and quality of the food on which the animal may feed.

Thus they found that when vegetables were used it was decidedly acid, and on the contrary, when animal flesh was used, it exhibited alkaline properties.

It is powerfully antiseptic; so much so, that if substances in a state of putrefaction be taken into the

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stomach, that process can sometimes be entirely suspended; though Mr. Hunter denies that it possesses any such property; but says, that substances, when subjected to its action, are made to go through another process; thereby preventing their spontaneous changes from taking place.

The most important and interresting property of the gastric juice is its powerfully solvent quality. It is so powerful, that even the hardest substances can scarcely resist its action. It is truly astonishing to see its effects in some animals. In the dog, for instance, it dissolves, without difficulty, the hardest bones, on which this animal sometimes feeds. How powerful soever the solvent quality of the gastric juice may be, it does not act on the stomach whilst vitality remains; but as soon as that departs, so soon does the stomach, then like other dead matter, yield to its influence.

The gastric juice in its effects has been compared to galvanism, and the parietes of the stomach to a galvanic battery. But all these experiments, and the opinions deduced from them, must be greatly deficient, since they are

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performed independently of vitality, which by its powerful influence produces effects that could not otherwise be produced. If it should be asked, why is Digestion promoted by the application of Galvanism to the stomach? it might be answered, that it does not produce this effect, from an identity of operation to the gastric fluid; but simply, like other stimulants, by increasing the activity of the stomach. The present and most popular theory of Digestion in the stomach, ascribes it principally to a solution of the aliments in the gastric juice; by which the materials of the aliment are decomposed, new compounds are formed, possessing properties totally different from the original. The changes, which are produced by the gastric juice, are probably purely chemical; though the stomach cannot be considered as a vessel, in which Digestion is performed solely by chemical means; if so the product of Digestion could be artificially obtained; but, on the contrary, it must be considered as a highly complicated function; dependent on several other auxiliary causes; such as animal heat, an internal motion of the aliment, somewhat resembling fermentation, but being

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probably very different. the gradual contraction of the muscular fibres of the stomach &c. The digestive process may therefore be said to consist of vital, chemical, and mechanical causes. Dr. Fordyce denies that any chemical effect is produced on the aliment by the gastric juice; but thinks that the alimentary substances, which have in themselves all the elements of chyle, are, by the action of the stomach and other organs of Digestion, decomposed and recombined in the form of a new substance. Whatever the action of the gastric juice may be, in producing Digestion, certain it is that it has a tendency to coagulate alimentary substances. Accordingly we find that the first change, which the food generally undergoes in the stomach, is coagulation.

This takes place so uniformly that it would seem as if it were necessarily preparatory to Digestion: nevertheless this process does not universally take place; water and alkohol, for instance, do not coagulate; but previously to the passage of the food out of the stomach; this coagulation is effected to form that septaceous mass, denominated chyme. The whole mass of food is not digested at the same time, but only that part which is in

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contact with the stomach. This part after having been converted into chyme is, by the action of the stomach, forced through the Pylorus, when another stratum of the aliment comes in contact with the parietes of the stomach to be effected in like manner. Thus Digestion proceeds from the circumference to the centre. The aliment remains in the stomach a longer or shorter time, according as it is more or less digestible: not a particle of it being suffered to escape unless thoroughly digested.

This office of preventing the passage of indigestible matter from the stomach, is performed by the Pylorus, which, by its tender and elective sensibility, yields only to the impression of the homogeneous chyme, to which by habit, it has become perfectly accustomed; unless some indigestible substance be swallowed, which, by repeatedly coming in contact with the Pylorus, accustoms it to its impression, and thus a passage is afforded. While Digestion is going on in the stomach, if it be perfect, both of its orifices are accurately shut. There is also at this time an increased activity of the stomach, caused by the metastasis, the vital power, deserting partially the other parts of the body to concentrate itself in that, which is the seat

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of the digestive process. In this manner we may be able to ascertain the cause of the deaths, which so frequently happen in consumptives, who indulge themselves in eating articles of a nature so indigestible to yield to the feeble powers of their systems; in which, so considerable a portion of vitality, deserting the other parts of the body to pass to the stomach, leaves them in such a debilitated condition, that it is beyond their power to react, and death follows as a necessary consequence. In this manner we may also explain, why Digestion is better performed in a state of rest, than in a state of activity. If exercise be taken that power which would otherwise be concentrated in the Stomach for the purpose of increasing the activity of Digestion, will be allotted to other organs for the discharge of their respective functions, and consequently Digestion will not be so perfectly performed as it would, had not this power been thus distributed. On the same principle we may also account for the drowsiness which is generally felt a short time after meals. In the commence=ment of Digestion a slight chill is generally perceived; the pulse becomes quicker and harder; the Stomach begins to act; its fibres at first irregularly, but after a short time reg=

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=ularly. Those which are circular commence their contractions at the Cardia and proceed to the Pylorus: whilst those, which are longitudinal, act so as to approximate its two extremities; by which means the angle formed at the Pylorus is somewhat overcome, thereby facilitating the passage of the food into the duodenum. It has been ascertained that Digestion is better performed during sleep, when we lie on our right than on our left side. The cause of this has been attributed to the weight of the liver pressing on the Stomach, when the left side is down.

But this mechanical theory is a very unsatisfactory one. Might it not be much better explained by attributing it to an easier passage of the food through the Pylorus, when we lie on the right side? As the Stomach empties itself, the chill goes off, and is succeeded by a degree of warmth, which increases the perspiration; an effect then is produced somewhat similar to a paroxysm of fever. Digestion is considerably influenced by nervous action. If the eighth pair of nerves be tied or cut, Digestion will be either imperfectly performed, or entirely suspended. Magendie of Paris thinks, that the

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tying or cutting of the eighth pair of nerves, does not influence Digestion by acting immediately on the Stomach, but by suspending the function of the lungs. To evince this, he cut the eighth pair of nerves below the branch, which supplies the lungs: when the result was, that Digestion was not materially interrupted; but on the contrary, when the same nerve was divided above the branch which goes to the lungs, that Digestion was entirely suspended. Passions of the mind, narcotic substances, or any thing lessening the excitability of the stomach, produce an effect somewhat similar.

## Of Digestion in the Duodenum

How important soever the changes are, which are produced in the Stomach, we have plausible reasons to believe, that they are not more so than those, which are effected in the Duodenum. This intestine on account of its peculiarities, such as its size and readiness of di-

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[illegible] its valvulæ conniventes, and [illegible] function similar to Digestion, may justly be called a second Stomach.

2dly. is the [illegible] of the whole digestive process is effected, viz. the separation of the chylous or nutritious part of the aliment from the excrementitious portion; but how this process is brought about, still remains a mystery; though physiologists at present generally agree, that the bil=iary, and pancreatic juices, which are poured into the duodenum, exert the principal agency.

These fluids are secreted by the Liver and Pancreas the former being situated principally in the right Hypo=chondriac, and the latter in the posterior part of the Epigastric region.

The bile is an extremely complicated fluid con==sisting of water, albumen, oil, alkali, and several salts. The pancreatic juice very much resembles the saliva. The presence of the chyme in the Duodenum produces an irritation on its parietes, which, extending by sympathy to the liver, gall=bladder, and pancreas,

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causes them to pour out their respective fluids more abun=
=dantly. The nature of the union between these fluids and
the alimentary mass is generally supposed to be chemical,
and by this display of chemical affinities it is generally
believed, that the chyle, the important product of Diges=
=tion in the duodenum, is produced.

But, to use the expression of a learned and distinguish=
=ed professor, whose name delicacy forbids me to mention,
" unfortunately for an hypothesis, which so conveniently
solved the problem, it has been, of late, found by exper=
=iments, that chyle may be produced, though the he=
=patic, cystic, and pancreatic ducts be tied ".

In some diseases, such as jaundice for instance, there
also exists a total obstruction to the passage of the bile
into the duodenum: nevertheless we observe that chyle, ap=
=parently perfect, is formed. May not the chyle in these
cases be somewhat defective, not having received the change
which is imparted to it by the bile; though perhaps suf=
=ficiently elaborated to carry on nutrition for a consider=
=able length of time? The bile, after being mixed with

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the chyme, divides into two parts; it's oily, coloured, and bitter principle, combines with the excrementitious part, and furnishes that gentle stimulus, necessary to excite the digestive tube; whilst it's albuminous and saline particles combine with the chyle, and become a constituent part of it's characteristick nature.

The chyle is a bland homogeneous fluid, always containing the same elements; no regard being had to the kind of food, on which the animal subsists.

Some physiologists acquiesced in the belief, that chyle in the intestines previously to it's absorption, is perfectly formed; though we have plausible reasons to believe, that it receives the finishing elaboration, during it's passage through the lacteals and mesenteric glands to the thoracic duct; but this change must be slight, since the chyle previously to it's absorption has the leading properties of blood.

It consists of three parts: I. One, which maintains it's fluidity during life, but coagulates after death, or by exposure to the air. This may be compared to the fibrine of the blood. II. One, which resembles the serum of the

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blood, in continuing fluid when exposed to the air, and in coagulating at the same degree of temperature as the blood. III. One consisting of small globules analogous to those of the blood, with this difference, that they are considerably more minute. From this perfect elaboration of the chyle, the present prevailing theory of the modus operandi of medicines derives its main supporting argument.

## Action of the Small Intestines

After the aliment has remained in the Duodenum a sufficient length of time for the proper formation of the chyle, it is propelled from that intestine into the Jejunum and Ileon, and from them into the large intestines; but its progress is considerably retarded by the curvatures of these intestines, and more particularly by the numerous foldings of their internal coat, called valvulae conniventes, which not only impede its progress, but by insinuating themselves into its internal part, afford a more

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extensive surface for the absorption of the chyle by the lac=
=teals, with which they are abundantly supplied.
The valvulæ conniventes together with the lacteals di=
=minish as they proceed towards the great intestines.
The great intestines may be considered as a kind of res=
=ervoir for containing the excrementitious part of the al=
=iment; until there be a call for its evacuation.
The aliment in these intestines is not entirely excremen=
=titious, as it still contains a small portion of chyle;
but it is soon rendered so by the absorption of this chyle.
In the large intestines there are a few lacteals, which,
decreasing in number as they proceed towards the rectum,
finally disappear. The faeces thus formed gradually accu=
=mulate in the rectum, exciting there an viritation necessa=
=ry for their evacuation.
When this is performed the abdominal muscles, being
called into action, forcibly press the intestines against the
back of the abdomen; the Diaphragm acting on them
from above downward; and the rectum itself contracting,
easily expel the faeces. With this I bring to a conclusion

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this dissertation. I might easily have extended it, but this extension would have led me beyond the bounds to which I am necessarily restricted. Nevertheless I hope I have said enough to make the subject clear and intelligible.

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